

Amended Patent Claims

1 1. Original) A method of cooling a blowing lance for
2 the treatment of a liquid metal melt in a metallurgical vessel,
3 especially steel in a RH vessel optionally subjected to a vacuum
4 and/or for the heating of a metal melt optionally under vacuum,
5 which can be inserted and withdrawn with respect to the interior of
6 the vessel by a lifting device and which has at least one inner
7 guide tube for feeding gases or solids, especially oxygen, with a
8 head-end lance mouth for blowing the gas onto the metal melt, and a
9 cooling jacket extending over its length for the passage
10 therethrough of a cooling medium, and in which the jacket has a
11 double-wall jacket tube forming inner and outer cooling passages
12 with a rerouting tube in the region of the head end, whereby the
13 metallurgical vessel is connected with a pump for pressure
14 reduction therein, characterized in that the instantaneous
15 available suction capacity of the pump limits the maximum flow of
16 the gas used as the cooling medium.

1 2. (original) The method according to claim 1
2 characterized in that the instantaneous available pump suction
3 capacity limits the maximum permissible cooling gas flow volume by
4 means of flow measurements and shuts down the cooling gas flow when
5 the instantaneous available pump suction capacity is exceeded.

1 3. (currently amended) The method according to ~~one of~~
2 ~~claims 1 or 2~~ claim 1 characterized in that as the cooling medium
3 preferably superheated steam, superheated by 20°C to 50°C is used.

1 4. (currently amended) The method according to ~~one of~~
2 ~~claims 1 to 3~~ claim 1 characterized in that during the oxygen
3 blowing, the cooling medium is fed into the inner cooling passage
4 and discharged through the outer cooling passage.

1 5. (currently amended) The method according to ~~one of~~
2 ~~claims 1 to 4~~ claim 1 characterized in that in the upper park
3 position of the blowing lance between treatment phases and in VCD
4 operation, the cooling medium is fed into the outer cooling passage
5 and discharged through the inner cooling passage.

1 6. (currently amended) The method according to ~~one of~~
2 ~~claims 1 to 5~~ claim 1 characterized in that the flow rate of the
3 cooling medium is controlled in dependence upon the measured
4 temperature at the outer periphery of the lance and/or the
5 instantaneous lance position.

1 7. (currently amended) The method according to ~~one of~~
2 ~~claims 1 to 7~~ claim 1 characterized in that the lance in startup is
3 initially preheated without cooling, preferably in that the lance
4 is fed into the already heated metallurgical vessel and only
5 thereafter is the steam cooling turned on.

6 8. (currently amended) The method according to ~~one of~~
7 ~~claims 1 to 7~~ claim 1 characterized in that steam at a pressure of
8 at least 7×10^5 Pa at a temperature of 160°C to 210°C is fed as
9 the coolant.

1 9. (currently amended) A device for carrying out the
2 method according to ~~one of claims 1 to 8~~ claim 1 with a
3 metallurgical vessel (200), in which a e blowing lance (10) can be
4 inserted and withdrawn with respect to the vessel interior by means
5 of a lifting device (24) and wherein the lance has at least one
6 inner guide tube (11) with a head-end lance mouth (12) and a
7 cooling jacket (13) which is comprised of an inner cooling passage
8 (15) and an outer cooling passage (16) which are connected through
9 a deflection tube (14) and which also comprises a pump (30) for
10 evacuating the metallurgical vessel (200) through a vacuum fitting
11 (22) characterized by a control unit (27) for adjusting the flow
12 rate of the gas used as the cooling medium whereby the control unit
13 (27) regulates the flow rate of the cooling medium in dependence
14 upon the instantaneous lance position, the suction capacity of the
15 vacuum pump and the measured outer wall temperature of the lance.

1 10. (original) The device according to claim 9
2 characterized in that temperature measuring sensors on the blowing
3 lance head and on the jacket of the blowing lance are arranged with
4 longitudinal axial spacing and are connected with the control unit
5 27.

6 11. (currently amended) The device according to ~~one of~~
7 ~~claims 9 or 10~~ claim 9 characterized by a condensate separator
8 through which the cooling medium passes before entering the cooling
9 passages.

1 12. (currently amended) The device according to ~~one of~~
2 ~~claims 9 to 11~~ claim 9 characterized in that the inner surface of
3 the outer cooling jacket tube (13a) turned toward the cooling
4 passage (16) has ribs (19) projecting radially into the cooling
5 channel (16).

1 13. (currently amended) The device according to ~~one of~~
2 ~~claims 9 to 12~~ claim 9 characterized in that the lance mouth is
3 configured as a Laval nozzle.